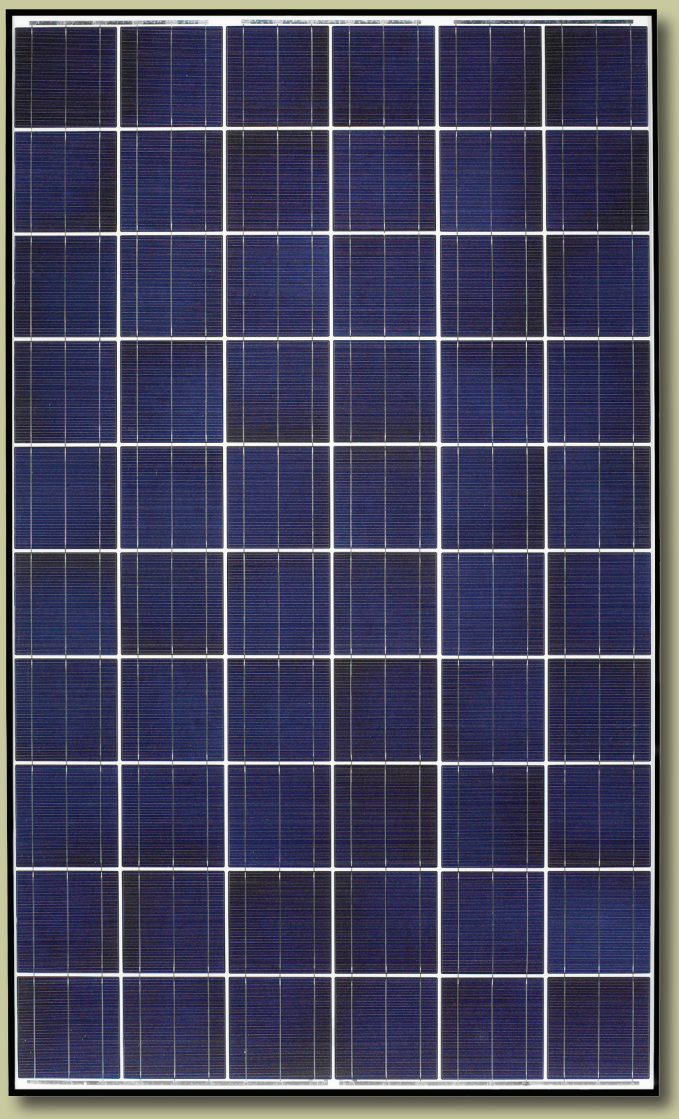
Small scale solar power plants for commercial facilities in island states

Supporting materials

1. Brochures of equipment installed
2. Drawings

KD-200-60 F Series

KD250GX-LFB2 KD255GX-LFB2



CUTTING EDGE TECHNOLOGY

As a pioneer with four decades of experience in the development of photovoltaic systems, Kyocera drives the market as a leading provider of PV products. We demonstrate our *Kaizen* philosophy, or commitment to continuous improvement, by setting the industry standard in the innovation of best-in-class solar energy equipment.

QUALITY BUILT IN

- UV-stabilized, anodized aluminum frame in black
- Supported by major mounting structure manufacturers
- Easily accessible grounding points on all four corners for fast installation
- Proven junction box technology with 12 AWG PV wire works with transformerless inverters
- Locking plug-in connectors provide safe, quick connections

PROVEN RELIABILITY

- Kyocera modules confirmed by the Desert Knowledge Australia Solar Centre to have the highest average output of any crystalline module
- First module manufacturer in the world to pass long-term sequential testing performed by TÜV Rheinland
- This series construction also passed TÜV Rheinland's Salt Mist Corrosion Test at Severity Level 6, the most intense test conditions available
- Only module manufacturer to achieve the rank of "Performance Leader" in all six categories of GTM Research's 2014 PV Module Reliability Scorecard

CERTIFICATIONS

- UL1703 Certified and Registered, UL Fire Safety Class C, CEC
- NEC2008 Compliant, IEC 61215/61730, and ISO 14001
- IEC61701 Ed.2 Severity 6 (Salt Mist Corrosion Test)

ELECTRICAL SPECIFICATIONS

Standard Test Conditions (STC) *STC = 1000 W/M² irradiance, 25°C module temperature, AM 1.5 spectrum**	KD250GX-LFB2	KD255GX-LFB2	
P_{max}	250	255	W
V_{mp}	29.8	30.4	V
I_{mp}	8.39	8.39	A
V_{oc}	36.9	37.6	V
I_{sc}	9.09	9.09	A
$P_{tolerance}$	+5/-0	+5/-0	%
Nominal Operating Cell Temperature Conditions (NOCT) *NOCT = 800 W/M² irradiance, 20°C ambient temperature, AM 1.5 spectrum**			
T_{NOCT}	45	45	°C
P_{max}	180	184	W
V_{mp}	26.8	27.4	V
I_{mp}	6.72	6.72	A
V_{oc}	33.7	34.4	V
I_{sc}	7.36	7.36	A
PTC	223.7	228.3	W
Temperature Coefficients			
P_{max}	-0.46	-0.46	%/°C
V_{mp}	-0.52	-0.52	%/°C
I_{mp}	0.0065	0.0065	%/°C
V_{oc}	-0.36	-0.36	%/°C
I_{sc}	0.060	0.060	%/°C
Operating Temp	-40 to +90	-40 to +90	°C
System Design			
Series Fuse Rating			15 A
Maximum DC System Voltage (UL)			600 V
Hailstone Impact			in (25mm) @ 51mph (23m/s)

* Subject to simulator measurement uncertainty of +/- 3%.
KYOCERA reserves the right to modify these specifications without notice.

NEC 2008 COMPLIANT
UL 1703 LISTED

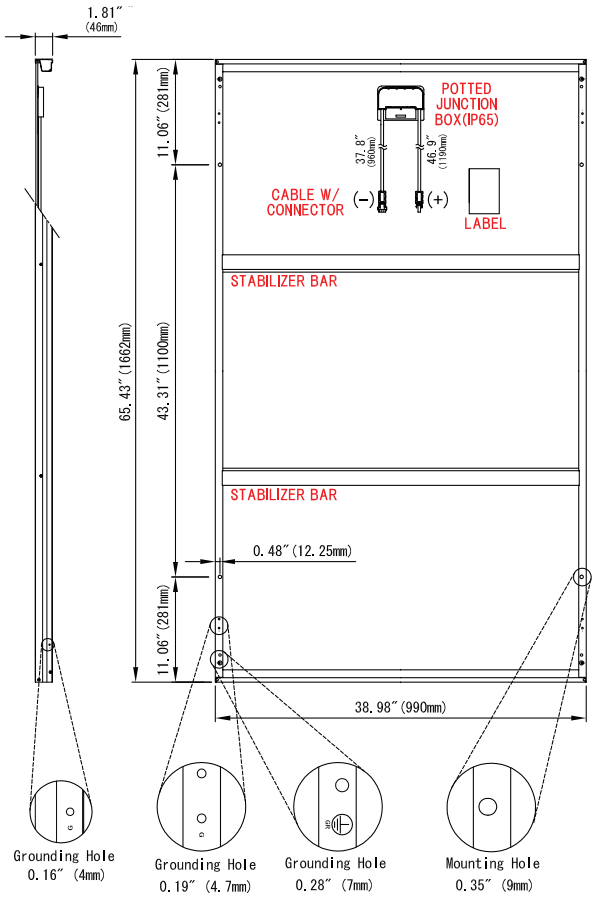
WARNING: Read the instruction manual in its entirety prior to handling, installing & operating Kyocera Solar modules.

MODULE CHARACTERISTICS

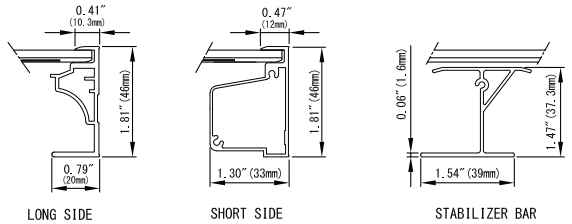
Cells per module:	**60 (6 x 10)**
Dimensions: *length/width/height*	**65.43in/38.98in/1.81in (1662mm/990mm/46mm)**
Weight:	**44.1lbs (20.0kg)**

PACKAGING SPECIFICATIONS

Modules per pallet:	**20**
Pallets per 53' container:	**36**
Pallet box dimensions: *length/width/height*	**66in/40in/47in (1675mm/1005mm/1175mm)**
Pallet box weight:	**990 lbs (450kg)**



FRAME CROSS SECTION DIAGRAM



032114

OUR VALUED PARTNER

Innovative

- First transformerless SMA inverter to be certified in accordance with UL 1741
- First inverter with arc-fault circuit interrupter listed according to UL 1699B

Economical

- Maximum efficiency of 98.7%
- Class-leading CEC efficiency of 98.5%
- Superior MPP tracking with OptiTrac™
- Transformerless, with H5 topology

Reliable

- OptiCool™ active temperature management

Convenient

- Integrated DC disconnect
- SMA Power Balancer for three-phase grid connection

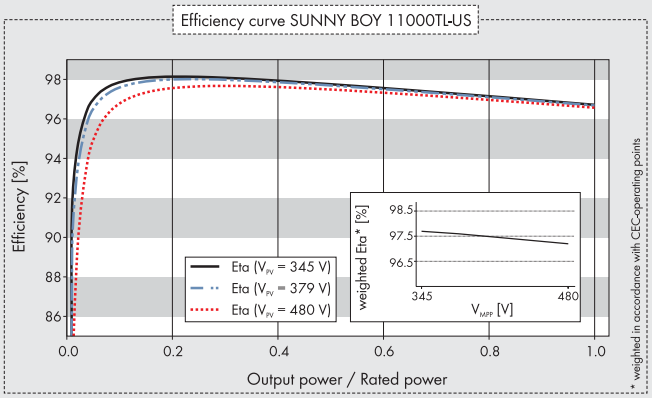
SUNNY BOY 6000TL-US / 7000TL-US / 8000TL-US / 9000TL-US / 10000TL-US / 11000TL-US

Transformerless design, maximum energy production

The Sunny Boy TL-US series is UL listed for North America and features SMA's innovative H5 topology, resulting in superior efficiencies of more than 98 percent and unmatched solar power production. The transformerless design reduces weight, increases the speed of payback and provides optimum value for any residential or decentralized commercial PV system. The Sunny Boy TL-US series for North America is the ideal choice in transformerless technology.

Technical data	Sunny Boy 6000TL-US		Sunny Boy 7000TL-US	
	208 V	240 V	208 V	240 V
Input (DC)				
Max. recommended PV power (@ module STC)	7500 W	7500 W	8750 W	8750 W
Max. DC power (@ cos φ = 1)	6300 W	6200 W	7300 W	7300 W
Max. input voltage	600 V	600 V	600 V	600 V
MPP voltage range / rated input voltage	300 V – 480 V / 345 V	345 V – 480 V / 379 V	300 V – 480 V / 345 V	345 V – 480 V / 379 V
Min. input voltage / initial input voltage	300 V / 360 V	345 V / 360 V	300 V / 360 V	345 V / 360 V
Max. input current	20.9 A	18.1 A	24.4 A	21.1 A
Max. input current per string	20.9 A	18.1 A	24.4 A	21.1 A
Number of independent MPP inputs	1	1	1	1
Strings per MPP input @ Combiner Box	6	6	6	6
Output (AC)				
Rated power / max. apparent AC power	6000 W / 6000 VA	6000 W / 6000 VA	7000 W / 7000 VA	7000 W / 7000 VA
Nominal AC voltage / nominal AC voltage range	208 V / 183 V – 229 V	240 V / 211 V – 264 V	208 V / 183 V – 229 V	240 V / 211 V – 264 V
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz		60 Hz / 59.3 Hz ... 60.5 Hz	
Max. output current	28.8 A	25 A	33.7 A	29.2 A
Power factor at rated power	1	1	1	1
Feed-in phases / connection phases	1 / 2	1 / 2	1 / 2	1 / 2
Efficiency				
CEC efficiency / max. efficiency	98 % / 98.6 %	98.5 % / 98.7 %	98 % / 98.6 %	98.5 % / 98.7 %
Protective devices				
DC reverse polarity protection	●	●	●	●
AC short-circuit current capability	●	●	●	●
Galvanic isolation	–	–	–	–
All-pole-sensitive residual-current monitoring unit	●	●	●	●
Arc-fault circuit interrupter (according to UL 1699B)	●	●	●	●
Protection class	I	I	I	I
Overvoltage category	IV	IV	IV	IV
General data				
Dimensions (W / H / D)	470 / 615 / 240 mm (18.4 / 24.1 / 9.5 inch)		470 / 615 / 240 mm (18.4 / 24.1 / 9.5 inch)	
Dimensions of DC Disconnect (W / H / D)	187 / 297 / 190 mm (7.28 / 11.7 / 7.5 inch)		187 / 297 / 190 mm (7.28 / 11.7 / 7.5 inch)	
Weight	35 kg / 78 lb	35 kg / 78 lb	35 kg / 78 lb	35 kg / 78 lb
Weight of DC Disconnect	3.5 kg / 8 lb	3.5 kg / 8 lb	3.5 kg / 8 lb	3.5 kg / 8 lb
Operating temperature range	-40 °C ... +60 °C / -40 °F ... +140 °F		-40 °C ... +60 °C / -40 °F ... +140 °F	
Noise emission (typical)	46 dB(A)	46 dB(A)	46 dB(A)	46 dB(A)
Self-consumption (night)	0.15 W	0.15 W	0.15 W	0.15 W
Topology	Transformerless H5	Transformerless H5	Transformerless H5	Transformerless H5
Cooling concept	OptiCool	OptiCool	OptiCool	OptiCool
Degree of protection	NEMA 3R	NEMA 3R	NEMA 3R	NEMA 3R
Degree of protection of connection area	NEMA 3R	NEMA 3R	NEMA 3R	NEMA 3R
Max. permissible value for relative humidity (non-condensing)	100 %	100 %	100 %	100 %
Features				
DC connection	Screw terminal	Screw terminal	Screw terminal	Screw terminal
AC connection	Screw terminal	Screw terminal	Screw terminal	Screw terminal
Display	Text line	Text line	Text line	Text line
Interface: RS485 / Bluetooth	O / O	O / O	O / O	O / O
Warranty: 10 / 15 / 20 years	● / O / O	● / O / O	● / O / O	● / O / O
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, UL 1699B			
Type designation	SB 6000TLUS-12		SB 7000TLUS-12	

Sunny Boy 8000TL-US		Sunny Boy 9000TL-US	
208 V	**240 V**	**208 V**	**240 V**
10000 W	10000 W	11250 W	11250 W
8400 W	8300 W	9400 W	9400 W
600 V	600 V	600 V	600 V
300 V – 480 V / 345 V	345 V – 480 V / 379 V	300 V – 480 V / 345 V	345 V – 480 V / 379 V
300 V / 360 V	345 V / 360 V	300 V / 360 V	345 V / 360 V
27.9 A	24.1 A	31.0 A	27.1 A
27.9 A	24.1 A	31.0 A	27.1 A
1	1	1	1
6	6	6	6
8000 W/8000 VA		9000 W / 9000 VA	
208 V / 183 V – 229 V	240 V / 211 V – 264 V	208 V / 183 V – 229 V	240 V / 211 V – 264 V
60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz
38.5 A	33.4 A	43.3 A	37.5 A
1		1	
1 / 2		1 / 2	
98 % / 98.6 %	98 % / 98.6 %	98 % / 98.6 %	98 % / 98.7 %
●		●	
●		●	
–		–	
●		●	
●		●	
I		I	
IV		IV	
470 / 615 / 240 mm (18.4 / 24.1 / 9.5 inch)		470 / 615 / 240 mm (18.4 / 24.1 / 9.5 inch)	
187 / 297 / 190 mm (7.28 / 11.7 / 7.5 inch)		187 / 297 / 190 mm (7.28 / 11.7 / 7.5 inch)	
35 kg / 78 lb		35 kg / 78 lb	
3.5 kg / 8 lb		3.5 kg / 8 lb	
-40 °C ... +60 °C / -40 °F ... +140 °F		-40 °C ... +60 °C / -40 °F ... +140 °F	
46 dB(A)		46 dB(A)	
0.15 W		0.15 W	
Transformerless H5		Transformerless H5	
OptiCool		OptiCool	
NEMA 3R		NEMA 3R	
NEMA 3R		NEMA 3R	
100 %		100 %	
Screw terminal		Screw terminal	
Screw terminal		Screw terminal	
Text line		Text line	
○ / ○		○ / ○	
● / ○ / ○		● / ○ / ○	
UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, UL 1699B			
SB 8000TLUS-12		SB 9000TLUS-12	



Accessories

Sunny Boy Combiner Box
SBCBTL6-10

Bluetooth Piggy-Back
BTPBINV-NR
with External Antenna
BTPB-EXTANT-NR

Interface RS485
485USPB-NR

SMA Power Balancer Set
PBL-SBUS-10-NR

● Standard feature ○ Optional feature – Not available
Data at nominal conditions

Technical data	Sunny Boy 10000TL-US		Sunny Boy 11000TL-US
	208 V	240 V	240 V
Input (DC)			
Max. recommended PV power (@ module STC)	12500 W	12500 W	13750 W
Max. DC power (@ cos φ = 1)	10500 W	10400 W	11500 W
Max. input voltage	600 V	600 V	600 V
MPP voltage range / rated input voltage	300 V – 480 V / 345 V	345 V – 480 V / 379 V	345 V – 480 V / 379 V
Min. input voltage / initial input voltage	300 V / 360 V	345 V / 360 V	345 V / 360 V
Max. input current	35 A	30.2 A	33.3 A
Max. input current per string	35 A	30.2 A	33.3 A
Number of independent MPP inputs	1	1	1
Strings per MPP input @ Combiner Box	6	6	6
Output (AC)			
Rated power / max. apparent AC power	10000 W / 10000 VA		11000 W / 11000 VA
Nominal AC voltage / nominal AC voltage range	208 V / 183 V – 229 V	240 V / 211 V – 264 V	240 V / 211 V – 264 V
AC power frequency / range	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz	60 Hz / 59.3 Hz ... 60.5 Hz
Max. output current	48.1 A	41.7 A	45.8 A
Power factor at rated power	1		1
Feed-in phases / connection phases	1 / 2		1 / 2
Efficiency			
CEC efficiency / max. efficiency	98.0 % / 98.6 %	98 % / 98.7 %	98 % / 98.7 %
Protective devices			
DC reverse polarity protection	●		●
AC short-circuit current capability	●		●
Galvanic isolation	–		–
All-pole-sensitive residual-current monitoring unit	●		●
Arc-fault circuit interrupter (according to UL 1699B)	●		●
Protection class	I		I
Overvoltage category	IV		IV
General data			
Dimensions (W / H / D)	470 / 615 / 240 mm (18.4 / 24.1 / 9.5 inch)		
Dimensions of DC Disconnect (W / H / D)	187 / 297 / 190 mm (7.28 / 11.7 / 7.5 inch)		
Weight	35 kg / 78 lb		
Weight of DC Disconnect	3.5 kg / 8 lb		
Operating temperature range	-40 °C ... +60 °C / -40 °F ... +140 °F		
Noise emission (typical)	46 dB(A)		46 dB(A)
Self-consumption (night)	0.15 W		0.15 W
Topology	Transformerless H5		Transformerless H5
Cooling concept	OptiCool		OptiCool
Degree of protection	NEMA 3R		NEMA 3R
Degree of protection of connection area	NEMA 3R		NEMA 3R
Max. permissible value for relative humidity (non-condensing)	100 %		100 %
Features			
DC connection	Screw terminal		Screw terminal
AC connection	Screw terminal		Screw terminal
Display	Text line		Text line
Interface: RS485 / Bluetooth	○ / ○		○ / ○
Warranty: 10 / 15 / 20 years	● / ○ / ○		● / ○ / ○
Certificates and approvals (more available on request)	UL1741, UL1998, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1, UL 1699B		
NOTE: US inverters ship with gray lids			
Type designation	SB 10000TLUS-12		SB 11000TLUS-12

Toll Free +1 888 4 SMA USA
www.SMA-America.com

SMA America, LLC

Certified

- UL 1741 and 1699B compliant
- Integrated AFCI meets the requirements of NEC 2011 690.11

Innovative

- Secure Power Supply provides daytime power during grid outages

Powerful

- 97.6% maximum efficiency
- Wide input voltage range
- Shade management with OptiTrac Global Peak MPP tracking

Flexible

- Two MPP trackers provide numerous design options
- Extended operating temperature range

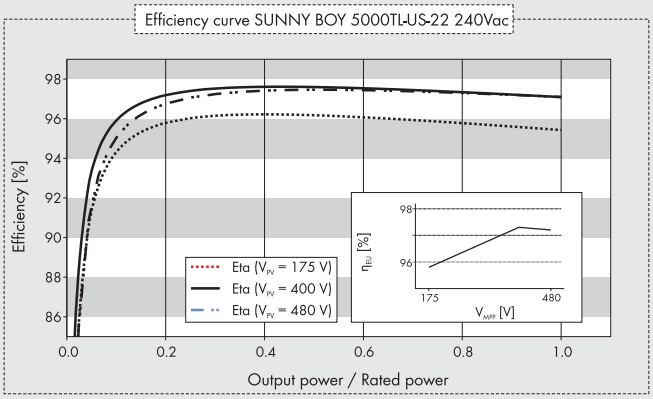
SUNNY BOY 3000TL-US / 3800TL-US /4000TL-US / 5000TL-US / 6000TL-US / 7000TL-US / 7700TL-US

Setting new heights in residential inverter performance

The Sunny Boy 3000TL-US/3800TL-US/4000TL-US/5000TL-US/6000TL-US/7000TL-US/7700TL-US represents the next step in performance for UL certified inverters. Its transformerless design means high efficiency and reduced weight. Maximum power production is derived from wide input voltage and operating temperature ranges. Multiple MPP trackers and OptiTrac™ Global Peak mitigate the effect of shade and allow for installation at challenging sites. The unique Secure Power Supply feature provides daytime power in the event of a grid outage. High performance, flexible design and innovative features make the Sunny Boy TL-US series the first choice among solar professionals.

MADE IN THE USA OF U.S. AND IMPORTED PARTS

Technical data	Sunny Boy 3000TL-US		Sunny Boy 3800TL-US		Sunny Boy 4000TL-US	
	208 V AC	240 V AC	208 V AC	240 V AC	208 V AC	240 V AC
Input (DC)						
Max. usable DC power (@ cos φ = 1)	3200 W		4200 W		4200 W	
Max. DC voltage	600 V		600 V		600 V	
Rated MPPT voltage range	175 – 480 V		175 – 480 V		175 – 480 V	
MPPT operating voltage range	125 – 500 V		125 – 500 V		125 – 500 V	
Min. DC voltage / start voltage	125 V / 150 V		125 V / 150 V		125 V / 150 V	
Max. operating input current / per MPP tracker	18 A / 15 A		24 A / 15 A		24 A / 15 A	
Number of MPP trackers / strings per MPP tracker	2 / 2					
Output (AC)						
AC nominal power	3000 W		3330 W	3840 W	4000 W	
Max. AC apparent power	3000 VA		3330 VA	3840 VA	4000 VA	
Nominal AC voltage / adjustable	208 V / ●	240 V / ●	208 V / ●	240 V / ●	208 V / ●	240 V / ●
AC voltage range	183 – 229 V	211 – 264 V	183 – 229 V	211 – 264 V	183 – 229 V	211 – 264 V
AC grid frequency; range	60 Hz / 59.3 – 60.5 Hz		60 Hz / 59.3 – 60.5 Hz		60 Hz / 59.3 – 60.5 Hz	
Max. output current	15 A		16 A		20 A	
Power factor (cos φ)	1		1		1	
Output phases / line connections	1 / 2		1 / 2		1 / 2	
Harmonics	< 4%		< 4%		< 4%	
Efficiency						
Max. efficiency	97.2%	97.6%	97.2%	97.5%	97.2%	97.5%
CEC efficiency	96.5%	96.5%	96.5%	97.0%	96.5%	97.0%
Protection devices						
DC disconnection device	●					
DC reverse-polarity protection	●					
Ground fault monitoring / Grid monitoring	● / ●					
AC short circuit protection	●					
All-pole sensitive residual current monitoring unit	●					
Arc fault circuit interrupter (AFCI) compliant to UL 1699B	●					
Protection class / overvoltage category	I / IV					
General data						
Dimensions (W / H / D) in mm (in)	490 / 519 / 185 (19.3 / 20.5 / 7.3)					
DC Disconnect dimensions (W / H / D) in mm (in)	187 / 297 / 190 (7.4 / 11.7 / 7.5)					
Packing dimensions (W / H / D) in mm (in)	617 / 597 / 266 (24.3 / 23.5 / 10.5)					
DC Disconnect packing dimensions (W / H / D) in mm (in)	370 / 240 / 280 (14.6 / 9.4 / 11.0)					
Weight / DC Disconnect weight	24 kg (53 lb) / 3.5 kg (8 lb)					
Packing weight / DC Disconnect packing weight	27 kg (60 lb) / 3.5 kg (8 lb)					
Operating temperature range	–40 °C ... +60 °C (–40 °F ... +140 °F)					
Noise emission (typical)	≤ 25 dB(A)		< 25 dB(A)		< 25 dB(A)	
Internal consumption at night	< 1 W		< 1 W		< 1 W	
Topology	Transformerless		Transformerless		Transformerless	
Cooling	Convection		Convection		Convection	
Electronics protection rating	NEMA 3R		NEMA 3R		NEMA 3R	
Features						
Secure Power Supply	●		●		●	
Display: graphic	●		●		●	
Interfaces: RS485 / Speedwire/Webconnect	o/o		o/o		o/o	
Warranty: 10 / 15 / 20 years	●/o/o		●/o/o		●/o/o	
Certificates and permits (more available on request)	UL 1741, UL 1998, UL 1699B, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1					
NOTE: US inverters ship with gray lids						
Type designation	SB 3000TL-US-22		SB 3800TL-US-22		SB 4000TL-US-22	



Accessories

Speedwire/Webconnect interface
SWDM-US-10

RS485 interface
DM-485CB-US-10

Fan kit for SB 3000/3800/4000/5000TL-US-22
FANKIT02-10

● Standard feature ○ Optional feature – Not available
Data at nominal conditions

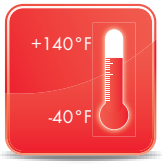
Sunny Boy 5000TL-US		Sunny Boy 6000TL-US		Sunny Boy 7000TL-US		Sunny Boy 7700TL-US	
208 V AC	**240 V AC**	**208 V AC**	**240 V AC**	**208 V AC**	**240 V AC**	**208 V AC**	**240 V AC**
5300 W		6300 W		7300 W		8000 W	
600 V		600 V		600 V		600 V	
175 – 480 V		210 – 480 V		245 – 480 V		270 – 480 V	
125 – 500 V		125 – 500 V		125 – 500 V		125 – 500 V	
125 V / 150 V		125 V / 150 V		125 V / 150 V		125 V / 150 V	
30 A / 15 A		30 A / 15 A		30 A / 18 A		30 A / 18 A	
2 / 2							
4550 W	5000 W	5200 W	6000 W	6000 W	7000 W	6650 W	7680 W
4550 VA	5000 VA	5200 VA	6000 VA	6000 VA	7000 VA	6650 VA	7680 VA
208 V / ●	240 V / ●	208 V / ●	240 V / ●	208 V / ●	240 V / ●	208 V / ●	240 V / ●
183 – 229 V	211 – 264 V	183 – 229 V	211 – 264 V	183 – 229 V	211 – 264 V	183 – 229 V	211 – 264 V
60 Hz / 59.3 – 60.5 Hz		60 Hz / 59.3 – 60.5 Hz		60 Hz / 59.3 – 60.5 Hz		60 Hz / 59.3 – 60.5 Hz	
22 A		25 A		29.2 A		32 A	
1		1		1		1	
1 / 2		1 / 2		1 / 2		1 / 2	
< 4%		< 4%		< 4%		< 4%	
97.2%	97.6%	97.0%	97.4%	96.8%	96.8%	96.8%	97.3%
96.5%	97.0%	96.5%	97.0%	96.5%	96.5%	96.5%	96.5%
●							
●							
● / ●							
●							
●							
●							
I / IV							
490 / 519 / 185 (19.3 / 20.5 / 7.3)							
187 / 297 / 190 (7.4 / 11.7 / 7.5)							
617 / 597 / 266 (24.3 / 23.5 / 10.5)							
370 / 240 / 280 (14.6 / 9.4 / 11.0)							
24 kg (53 lb) / 3.5 kg (8 lb)							
27 kg (60 lb) / 3.5 kg (8 lb)							
–40 °C ... +60 °C (–40 °F ... +140 °F)							
< 29 dB(A)		< 29 dB(A)		< 29 dB(A)		< 29 dB(A)	
< 1 W		< 1 W		< 1 W		< 1 W	
Transformerless		Transformerless		Transformerless		Transformerless	
Convection		Fan		Fan		Fan	
NEMA 3R		NEMA 3R		NEMA 3R		NEMA 3R	
●		●		●		●	
●		●		●		●	
○/○		○/○		○/○		○/○	
●/○/○		●/○/○		●/○/○		●/○/○	
UL 1741, UL 1998, UL 1699B, IEEE1547, FCC Part 15 (Class A & B), CAN/CSA C22.2 107.1-1							
SB 5000TL-US-22		SB 6000TL-US-22		SB 7000TL-US-22		SB 7700TL-US-22	

More efficient

Shade management

Easier

Secure Power Supply



Broad temperature range

Flexible communications

A NEW GENERATION OF INNOVATION

THE SUNNY BOY TL-US RESIDENTIAL SERIES HAS YET AGAIN REDEFINED THE CATEGORY.

Transformerless design

The Sunny Boy 3000TL-US / 3800TL-US / 4000TL-US / 5000TL-US / 6000TL-US / 7000TL-US / 7700TL-US are transformerless inverters, which means owners and installers benefit from high efficiency and lower weight. A wide input voltage range also means the inverters will produce high amounts of power under a number of conditions.

Additionally, transformerless inverters have been shown to be among the safest string inverters on the market. An industry first, the TL-US series has been tested to UL 1741 and UL 1699B and is in compliance with the arc fault requirements of NEC 2011.

Increased energy production

OptiTrac™ Global Peak, SMA's shade-tolerant MPP tracking algorithm, quickly adjusts to changes in solar irradiation, which mitigates the effects of shade and results in higher total power output. And, with two MPP trackers, the TL-US series can ably handle complex roofs with multiple orientations or string lengths.

An extended operating temperature range of -40 °F to +140 °F ensures power is produced in all types of climates and for longer periods of time than with most traditional string inverters.

Secure Power Supply

One of many unique features of the TL-US residential series is its innovative Secure Power Supply. With most grid-tied inverters, when the grid goes down, so does the solar-powered home. SMA's solution provides daytime energy to a dedicated power outlet during prolonged grid outages, providing homeowners with access to power as long as the sun shines.

Simple installation

As a transformerless inverter, the TL-US residential series is lighter in weight than its transformer-based counterparts, making it easier to lift and transport. A new wall mounting plate features anti-theft security and makes hanging the inverter quick and easy. A simplified DC wiring concept allows the DC disconnect to be used as a wire raceway, saving labor and materials.

The 3800TL-US and 7700TL-US models allow installers to maximize system size and energy production for customers with 100 A and 200 A service panels.

Leading monitoring and control solutions

The new TL-US residential line features more than high performance and a large graphic display. The monitoring and control options provide users with an outstanding degree of flexibility. Multiple communication options allow for a highly controllable inverter and one that can be monitored on Sunny Portal from anywhere on the planet via an Internet connection. Whether communicating through RS485, or SMA's new plug-and-play WebConnect, installers can find an optimal solution to their monitoring needs.

Wide Power Class Range

Whether you're looking for a model to maximize a 100 A service panel or trying to meet the needs of a larger residential PV system, the Sunny Boy TL-US with Secure Power Supply has you covered. Its wide range of power classes—from 3 to 7.7 kW—offers customers the right size for virtually any residential application. The TL-US series is not only the smartest inverter on the planet, it's also the most flexible.

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SMA America, LLC

GREEN CLASS METER

E-Mon D-Mon
Energy Monitoring Products & Systems

Features

- Direct-read 2-line alpha-numeric LCD display without multiplier displays cumulative kWh, peak demand w/ date & time and “real-time” kW load.
- User entered cost per KWH provides to-date energy cost and projected hourly cost based on metered load.
- Displays total carbon (CO2) emissions in pounds (lbs.) and indicates hourly emissions based on metered load.
- Available in MMU (Multiple Meter Unit) enclosures containing up to 24 meters in one compact enclosure.
- 0-2 volt output split-core current sensors promote enhanced safety and allow remote mounting of current sensors up to 2000 feet from meter without power interruption. (Optional solid-core sensors available for 100 & 200 amp.)
- Onboard installation diagnostics & verification system.
- Parallel up to three (3) sets of current sensors for cumulative reading.
- Meter can be used on the following configurations:
  3-Phase, 4-Wire
  3-Phase, 3-Wire
  For other configurations contact factory.
- Fixed-value pulse output.
- Green industrial-grade JIC steel enclosure (standard) with padlocking hasp and mounting flanges for indoor installations with 1 1/16" KO (3/4" cond.) bottom, 7/8” (1/2” cond.) top.
- Optional gray NEMA 4X poly carbonate enclosure with padlocking hasp & mounting flanges for indoor/outdoor installation (stand alone) with one 1 1/16” KO on bottom of enclosure.
- Non-volatile Memory.
- UL/CUL Listed.
- Revenue Grade Accuracy. Certified by independent test lab to ANSI C12.20 national accuracy standards. (+/- 0.2% from 1% to 100% of rated load.)
- New York City approved, Con Edison approved for RSP program.

Dimensions: 7 1/4" H x 7" W x 3 1/4" D

Model Numbers

120/208-240V, 3-Phase

E20-208100-J-G-KIT (100 amp)
E20-208200-J-G-KIT (200 amp)
E20-208400-J-G-KIT (400 amp)
E20-208800-J-G-KIT (800 amp)
E20-2081600J-G-KIT (1600 amp)
E20-2083200J-G-KIT (3200 amp)

277/480V, 3-Phase

E20-480100-J-G-KIT (100 amp)
E20-480200-J-G-KIT (200 amp)
E20-480400-J-G-KIT (400 amp)
E20-480800-J-G-KIT (800 amp)
E20-4801600J-G-KIT (1600 amp)
E20-4803200J-G-KIT (3200 amp)

347/600V, 3-Phase (Wye Configuration)

E20-600100-J-G-KIT (100 amp)
E20-600200-J-G-KIT (200 amp)
E20-600400-J-G-KIT (400 amp)
E20-600800-J-G-KIT (800 amp)
E20-6001600J-G-KIT (1600 amp)
E20-6003200J-G-KIT (3200 amp)

Optional Meter Enclosures

Replace “J” in model number with optional enclosure specification.

Specification M - MMU Configuration
(ex. E20-208100-M-G-KIT)
Specification R - NEMA 4X Raintight Enclosure
(ex. E20-6001600R-G-KIT)

NOTE: All meter kits include one set of three (3) split-core current sensors

Green Class Meter
Engineering Specifications

E-Mon D-Mon
Energy Monitoring Products & Systems

- Meter shall be fully electronic with digital 8-digit LCD display without multiplier displaying cumulative kWh and “real-time” kW load. Meter shall provide rate of consumption indication and also a segment test button (CPU) to ensure integrity of the display.
- Meter shall provide a scrolling display of:
  - Total kWh consumed to date
  - Total energy cost to date in dollars
  - Present load in Kilowatts
  - Projected hourly cost based on present load
  - Total lbs. of CO2 emissions to date (based on DOE supplied national average)
  - Projected hourly CO2 emissions based on present load
- Meter shall accept kilowatt hour costs entered by user.
- Meter shall provide a load indicator to indicate real-time consumption levels for field testing and certification.
- Meter shall be equipped with current sensor diagnostic indicator for installation verification.
- Meter shall be enclosed in a green heavy-duty JIC steel enclosure suitable for indoor installation. Meter enclosure provides a method of locking to prevent unauthorized access.
- Meter shall be optionally available in a gray outdoor NEMA 4X polycarbonate enclosure with padlocking hasp & mounting flanges for indoor/outdoor installation.
- Meter shall be optionally available in MMU (Multiple Meter Unit) enclosures containing up to 24 meters in one compact enclosurel.
- Meter shall be UL Listed/CUL Listed to the latest applicable standards for safety.
- Meter shall be certified by a nationally recognized independent test facility to ANSI C12.20 (+/- 0.2% from 1% to 100% of rated load) specifications with split-core current sensors.
- Meter shall be listed by the California Energy Commission, New York City approved and Con Edison approved for RSP program.
- Meter shall be provided with a non-volatile memory to maintain reading during power outages.
- Meter shall use 0-2 volt output current sensors to allow paralleling and/or mounting up to 2,000 feet from the meter. Sensors shall be of split-core configuration to allow installation without powering down. Sensors shall be available from 100 amp to 3200 amp. Sensors shall be optionally available in solid-core configuration (100 & 200 amp.)
- Meter shall be provided with modular connector(s) to provide interfacing with:
  - AMR (Automatic Meter Reading)
  - Building Management/Energy Management Systems
- Meters shall be compatible with E-Mon Energy™ software.

SUNNY WEBBOX / SUNNY WEBBOX WITH BLUETOOTH

Reliable

- Remote monitoring, diagnosis and configuration of the solar power system from anywhere in the world
- Data logger for all key plant data

Responsive

- Rapid detection of operation failures
- Error notification via e-mail or text message

User-friendly

- Easy remote access via a web browser
- Includes free standard access to the Sunny Portal for the entire service life of the system

Informative

- Flexible display, evaluation, yield and event reports via the Sunny Portal

SUNNY WEBBOX

Remote monitoring and maintenance of large solar power plants

The Sunny WebBox is the ideal monitoring solution for large solar plants. It receives and stores current measurement values and transmits data via *Bluetooth*® or RS485, keeping you informed of system performance 24 hours per day. In the event of a problem, the Sunny WebBox allows you to react quickly. Parameters can be changed remotely and a variety of measured values can be depicted, analyzed and downloaded via a Web browser from anywhere in the world with an Internet connection. All data from the connected devices is stored and, if desired, automatically transmitted to the Sunny Portal. With the optional GSM modem, measurement data can even be transmitted to the Sunny Portal from remote locations.

Technical data	Sunny WebBox	Sunny WebBox with Bluetooth
Communication		
Inverter communication	RS485, 10/100 Mbit Ethernet (only for Sunny Central)	Bluetooth
PC-communication	10/100 Mbit Ethernet	10/100 Mbit Ethernet
Data Interface	Modbus TCP, RPC	RPC
Connections		
Inverter	1x SMACOM	–
Ethernet	10/100 Mbit, RJ45	10/100 Mbit, RJ45
Max. number of SMA devices		
RS485 / Ethernet	50 / 50	–/–
Bluetooth	–	50
Max. communication range		
RS485 / Ethernet	1200 m / 100 m (3937 ft / 328 ft)	–/–
Bluetooth (unobstructed)	–	Up to 100 m (328 ft)** (can be extended with an SMA Bluetooth Repeater)
Power supply		
Power supply	External plug-in power supply	External plug-in power supply
Input voltage	100 V – 240 V AC, 50 / 60 Hz	100 V – 240 V AC, 50 / 60 Hz
Power consumption	Typ. 4 W/ max. 12 W	Typ. 4 W/ max. 12 W
Environmental conditions in operation		
Ambient temperature	–20 °C ... +55 °C (–4 °F ... +131 °F)	–20 °C ... +65 °C (–4 °F ... +149 °F)
Relative humidity	5% ... 95%, non-condensing	5% ... 95%, non-condensing
Memory		
Internal	8 MB in a ring memory configuration	12.5 MB in a ring memory configuration
External	SD card 1 GB / 2 GB (optional)	SD card 1 GB / 2 GB (optional)
General data		
Dimensions (W / H / D) in mm (in)	255 / 130 / 57 (10 / 5 / 2)	
Weight	750 g (2 lb)	
Mounting location	Indoors	Indoors
Installation options	DIN rail installation, wall mounting, tabletop device	DIN rail installation, wall mounting, tabletop device
Status display	LEDs	LEDs
Language versions (software, manual)	German, English, French, Greek, Italian, Korean, Dutch, Portuguese, Spanish, Czech	
Features		
Operation	Integrated Web server (Internet browser)	Integrated Web server (Internet browser)
Warranty: 5 years	●	●
Certificates and approvals	www.SMA-Solar.com	www.SMA-Solar.com
Accessories		
Sunny SensorBox	Connection via RS485 Power Injector	Connection via SMA Power Injector with Bluetooth
SMA Bluetooth Repeater for extending the max. communication range	–	o
SD card 1 GB / 2 GB	o	o
RS485 communication cables	o	–
Plug-in power supply with adapters	●	●

** Up to 50 m (165 ft) with SMA Bluetooth® Piggy-Back. Required for Sunny Boy 3000-US / 3800-US / 4000-US / 5000-US / 6000-US / 7000-US / 8000-US and 8000TL-US / 9000TL-US / 10000TL-US

● Standard features o Optional features – Not available

Type designation	Sunny WebBox	Sunny WebBox with Bluetooth

Communication with the inverters via RS485 or *Bluetooth*

Presentation of plant data with Sunny Matrix or Flashview

Free, automatic **visualization** of the measurement data in Sunny Portal

SD card slot for optional **memory expansion** and data transfer to a PC

Integrated web server enables **online remote data access** from any web-enabled PC in the world

Integrated FTP server for data transfer and storage on a PC

Quick set-up thanks to Sunny WebBox Assistant and the quick reference guide

Flexible, simultaneous data transfer to an FTP server and the Sunny Portal

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Reliable
- Rapid error detection

Informative
- Precise measurement of irradiation intensity, module temperature, ambient temperature and wind speed

Easy to Install
- Simple integration into existing PV plants via RS485

Convenient
- Data analysis on any PC or in the Sunny Portal

SUNNY SENSORBOX

The weather station for PV systems

The Sunny SensorBox is installed directly onto solar modules and measures irradiation and temperature. In combination with Sunny WebBox and Sunny Portal, it provides continuous meteorlogical and power production data. This makes it possible to detect shade, dirt, and gradually declining array performance, providing security against lost yield. An optional sensor to measure of ambient temperature or wind speed provides even more data.

Technical data	Sunny SensorBox
Communication	
Data logger communication	RS485 to Sunny WebBox, RS485 to Sunny Boy Control
Interfaces	
Sunny WebBox and Power Injector	1x SMACOM / spring terminals
Max. communication range	
RS485	1200 m (3937 ft)
Power supply	
Power supply	RS485 Power Injector
Input voltage	100 V – 240 V AC, 50 / 60 Hz
Power consumption	< 1 W
Environmental conditions in operation	
Ambient temperature	–25 °C ... +70 °C (–13 °F ... +158 °F)
Protection rating (as per EN 60529)	IP65
General data	
Dimensions (W / H / D) in mm (in)	120 / 50 / 90 (5 / 2 / 3.5)
Weight	500 g (1102 lb)
Mounting location	outdoor
Deployment options	mounting plate, roof bracket
Language versions (manual)	German, English, French, Italian, Spanish, Dutch, Czech, Portuguese, Greek
Features	
Operation	via the Sunny WebBox interface
Warranty: 5 years	●
Certificates and approvals	www.SMA-Solar.com
Accessories	
Mounting plate	o
Roof bracket	o
Wind sensor	o
Wall mounting bracket for wind sensor	o
PT100 ambient temperature sensor	o
PT100 module temperature sensor	●
RS485 Power Injector	●
SMA Power Injector with *Bluetooth*®	o

● Standard features o Optional features – Not available

Communication with the Sunny WebBox via RS485

Continuous **monitoring** of generator performance in Sunny Portal

Measurement of radiation and module temperature (plus optional measurement of ambient temperature and wind speed)

Easy installation; data transmission and energy supply via a common cable

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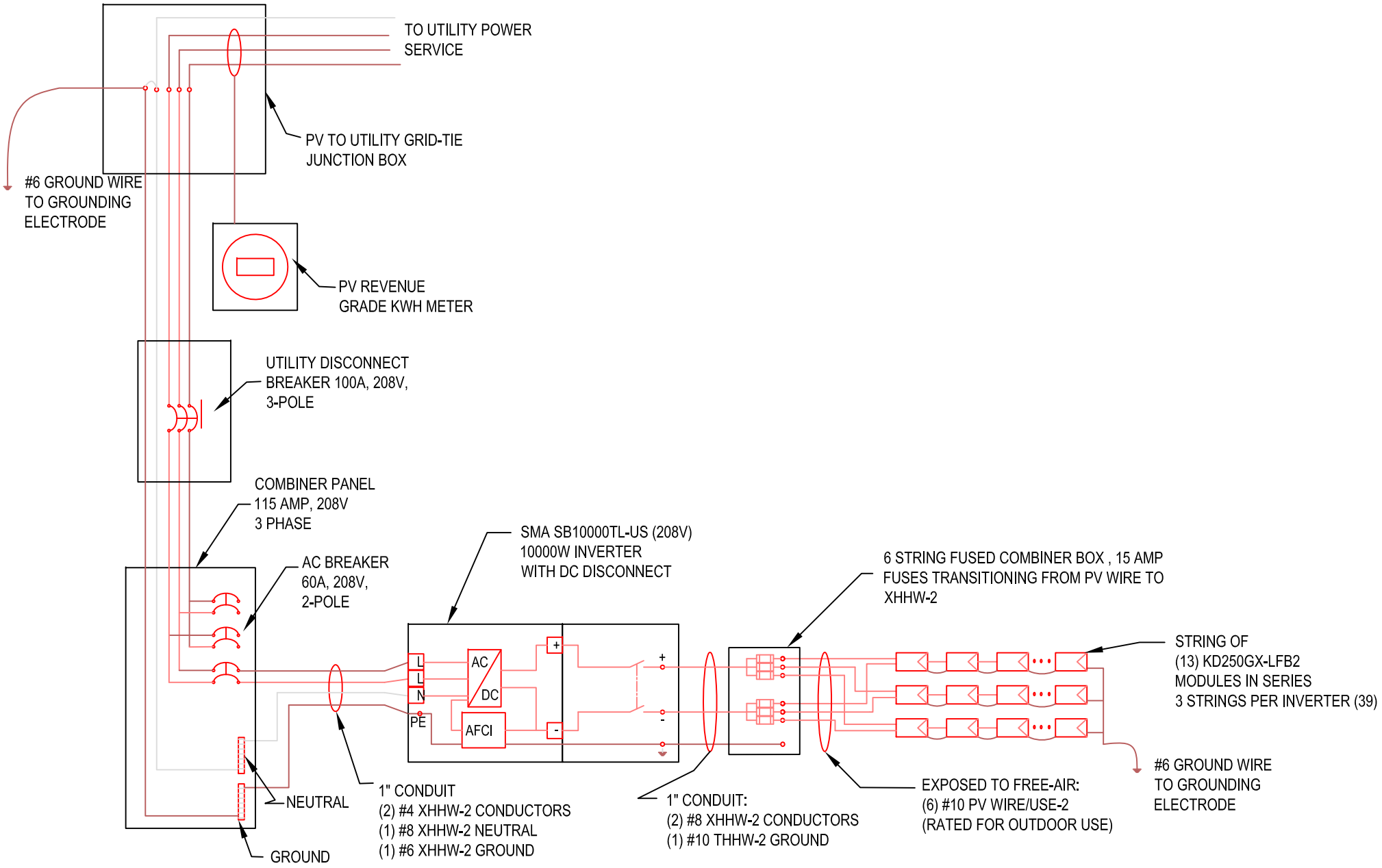
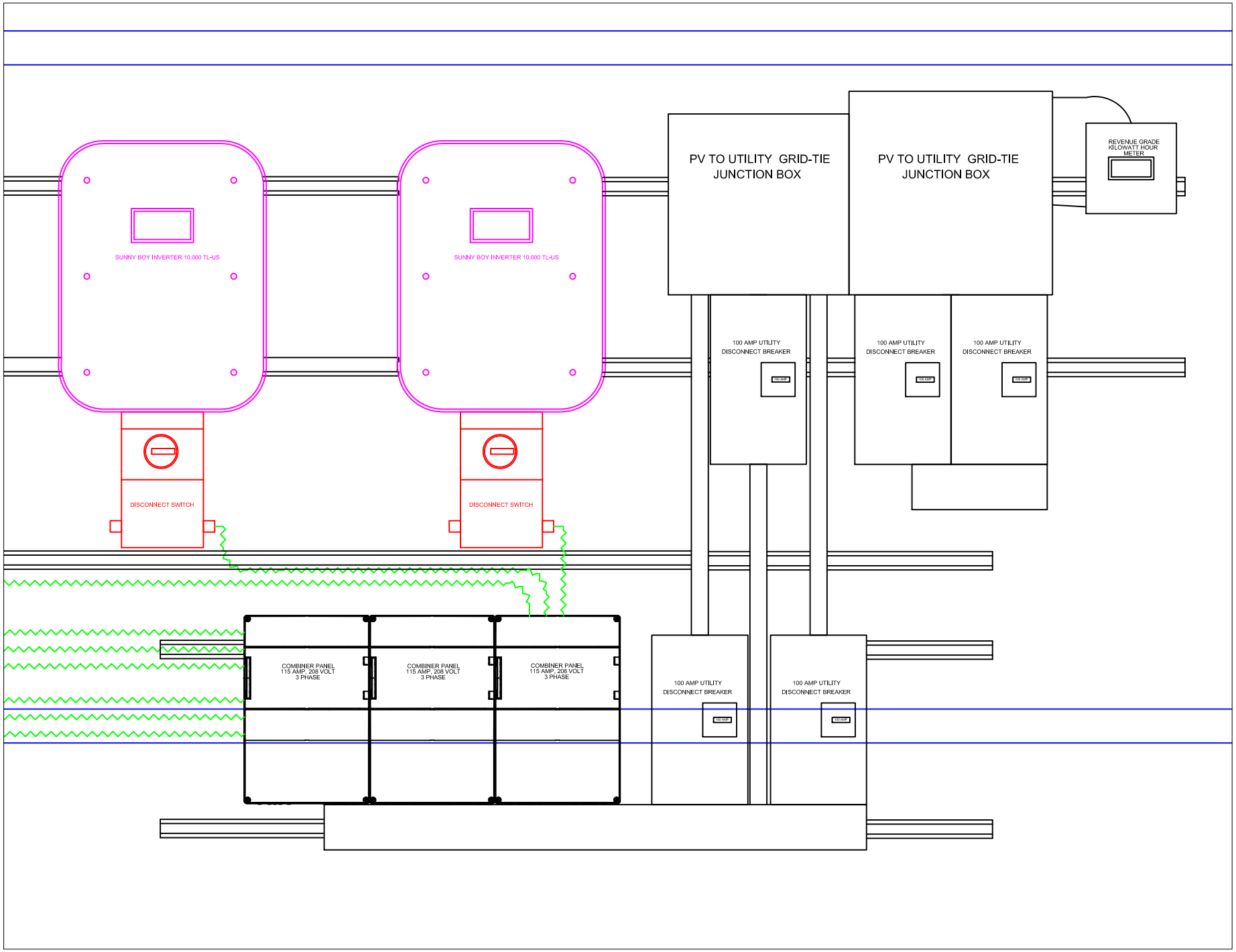


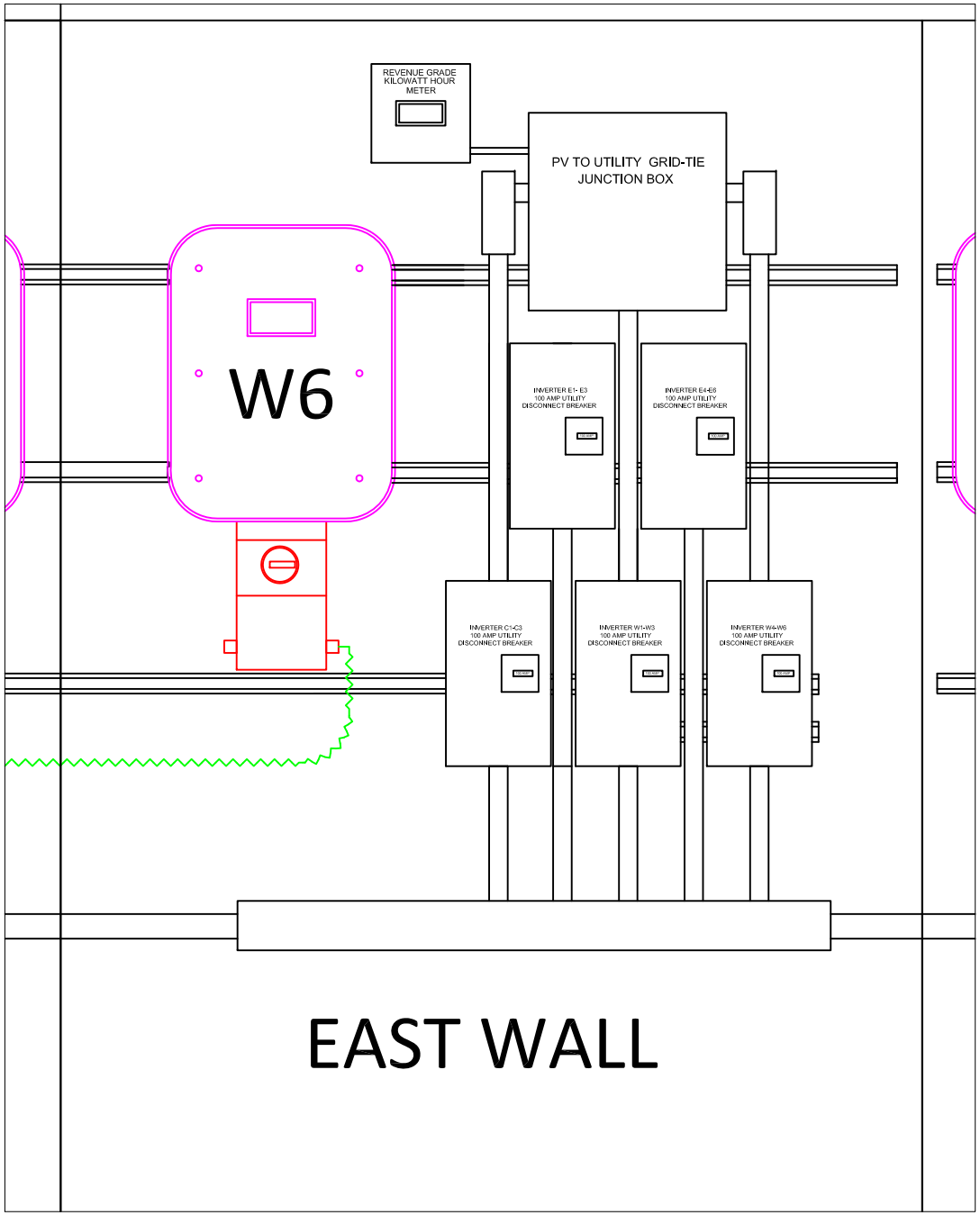
TYPICAL ELECTRICAL WIRING

Subproject 1



COMBINED GRID TIE POINT IN SOUTH WAREHOUSE

Subproject 2



SAS ROOFTOP SOLAR GRID TIE-POINT